

**Beverly  
United Shoe Machine  
181 Elliot Street  
RTN 3-610  
RTN 3-14836**

MassDEP  
August 16, 2013

#### Review of Indoor Air Data

- Indoor Air Sampling Analysis & Risk Characterization Report, May 24, 2013
- Risk Characterization, (Soil Vapor 2004 Sampling Data), January 2005
- Report on Soil Vapor Survey Results, Suite 130Q – 100 Cummings Center, July 2003

The boxed lists of volatile organic compounds below, are those that are present in both soil gas and indoor air. The italicized headings of each box indicate the likely status based on a comparison of the indoor air levels, soil vapor levels, and Residential Threshold Values.

Building 100 is the location of the Bright Horizons Children's Center and the Futures Behavior Therapy Center. Building 600 is the location of the Beverly Children's Center and therefore Critical Exposure Pathways may apply at these locations, and it appears reasonable to use the MassDEP Residential Threshold Values (TVs) to evaluate levels of site contaminants in indoor air in buildings 100 and 600.

The conclusions section of the 2013 Risk Characterization recognized the elevated levels of petroleum fractions in buildings 100 and 600. The report concludes that elevated levels of petroleum fractions are likely from indoor sources and recommends a product inventory and re-sampling of Building 100. It seems the same recommendations could be applied to building 600 based on a level of C5-C8 petroleum fraction in indoor air (100 ug/m<sup>3</sup>) exceeding the Residential Threshold Value (TV), and C5-C8 soil vapor at 1660 ug/m<sup>3</sup>. Although the levels of C5-C8 soil vapor beneath building 600 do not exceed the Residential Soil Vapor Screening Value (4100 ug/m<sup>3</sup>), this potential vapor intrusion issue would benefit from further evaluation because C5-C8 is present in both soil vapor and indoor air.

#### *Needs further evaluation exceeds TVs*

C5-C8 - exceeds TV in indoor air, in soil vapor  
Bldg 100 indoor air, S-157 C5-C8 = 320 ug/m<sup>3</sup>  
Bldg 600 indoor air, S-171, C5-C8 = 100 ug/m<sup>3</sup>

C9-C12- exceeds TV in indoor air, in soil vapor  
Bldg 100 indoor air, S-149 C9-C12 = 110 ug/m<sup>3</sup>  
Bldg 600 indoor air, S-171, C9-C12 = 71 ug/m<sup>3</sup>

C9-C10 - exceeds TV in indoor air, in soil vapor  
Bldg 100 indoor air, S-157 C9-10 = 160 ug/m<sup>3</sup>

(soil vapor bldg 600 c5-c8 = 1660 ug/m3)  
 (soil vapor bldg 500 c5-c8 = 2200 ug/m3)  
 (soil vapor bldg 100 volatile petroleum hydrocarbons = not detected)

Cyclohexane - in soil vapor and indoor air (no TVs, use APH)  
 Hexane - in soil vapor, no TV, in indoor air, use APH  
 Heptane - in soil vapor, no TV, use APH, in indoor air  
 Trimethylbenzene - in soil vapor and indoor air (no TVs, use APH)

*May be due to vapor intrusion, but HI very low*

Tetrahydrofuran - in soil vapor, no TV, in indoor air 0.7 ug/m3, (10 ug/m3 max in soil vapor)  
 Hazard Index for 0.7 ug/m3, HI = 0.0004. (RFC = 2 mg/m3)

*Depending upon 2 additional confirmatory rounds, no action needed soil vapor levels low compared to indoor levels*

Ethanol - in soil vapor, no TV, in indoor air (3 ug/m3 max in soil vapor)  
 Isopropyl alcohol - in soil vapor, no TV, in indoor air (35 ug/m3 max in soil vapor)

*Depending upon 2 additional confirmatory rounds, no action needed less than TVs*

Methylene Chloride - in soil vapor, exceeds TV in indoor air (BLD 100 S157, Bld 500 S1100), same as outdoor air roof sample  
 Trichlorofluoromethane - in soil vapor, in indoor air, no TV, levels same in outdoor air  
 Freon 113 and Freon 114 in indoor at about 0.5 ug/m3, but not in soil vapor  
 Bromodichloromethane - in soil vapor, avg of 2 dups in indoor air (0.1435) equal to the TV  
 1,1,1-TCA – in soil vapor, less than TV in indoor air  
 1,3-butadiene - in soil vapor, no TV, in indoor air  
 2-butanone – in soil vapor, less than TV in indoor air  
 Acetone – in soil vapor, less than TV in indoor air  
 Benzene - in soil vapor, less than TV in indoor air  
 Chloroform - in soil vapor, less than TV in indoor air  
 Ethylbenzene - in soil vapor, less than TV in indoor air  
 Xylenes - in soil vapor, less than TV in indoor air  
 Naphthalene - in soil vapor, less than TV in indoor air  
 Tetrachloroethene - in soil vapor, less than TV in indoor air  
 Toluene - in soil vapor, less than TV in indoor air